

Collaboration between University-Industry for Engineering Student

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Abstract: The technical university college (TUC) was formed by government to produce highly skilled engineers which comprises both theoretical competency as well as practical competency. TUC graduates can be referred to as application-and-practical oriented engineers. Kolej Universiti Kejuruteraan Utara Malaysia (KUKUM) is one of the TUCs that was established more than 4 years ago. The practical and application oriented education requires student to experience the reality of engineering and technology in a real world context from an early stage of their professions development. Therefore, the collaboration programmes with the industry is one of the important parts for the student's undergraduate program. In addition, besides attending regular lecturer and labs, students are also required to undergo industrial training (intra) for completing their degree program. This training is compulsory for all engineering students to fulfill the bachelor's degree program. This training is also exposes the students with industrial environment; provide opportunities for students to apply the knowledge and skills acquired during their study to practical demands of the workplace and to develop interpersonal and communication skills required of a person working in a professional capacity. This paper aims to describe the overview of collaboration between this university and industry.

Keywords: TUC, engineer, practical oriented, intra, skill, collaboration, industry.

1. Introduction

KUKUM was approved by the cabinet as a public institution of higher learning in May, 2001 [1]. The academic system was started in June, 2002 with the first intake comprise of 116 engineering students. Is now has roughly 2000 students and a workforce of more than 600 people comprising both academic and non-academic staff. Through six engineering schools, there are 12 academic programs offered. The academic programme at KUKUM aims to produce highly skilled engineers who are capable of planning, designing, testing, and maintaining devices, systems, and process, as well as being capable of solving engineering problems in an innovative and creative manner. As one of the TUCs, the engineering program is the practical oriented approach. It is an approach that required students to experience the professional practice of their specialization and to apply their knowledge to solve industrial related problems [2]. This approach is established widely in Germany especially [3].

KUKUM is expected to work closely with the industry in developing its academic programmes, training its student and conducting R&D activities. In order to provide the platform close with industry, the Center for Industrial Collaboration (CIC) was formed in KUKUM on 18th of March 2004. The objectives of CIC include:

- To introduce KUKUM to industry.
- To plan, help and execute various activities.
- To offer industrial expose to staff and students.
- To expose the general public and industry on the academic programmes and quality of KUKUM through close participation with the industry.
- To support the 'Practical Intensive' concept as practiced at KUKUM.
- To promote and coordinate cooperation in areas such as consultations, training, technical support and research.

The CIC plays the role of fostering relationship with the industry from various aspects, especially with respect to programmes that have direct bearing to students' learning [6]. The programmes comprise of Industrial Exposure (IndEx), Industrial Entrepreneurship (IndEnt), Industrial Training (InTra), staff training programmes, and many others [4]. The training given to students starts in the first year and ends in the fourth year with the involvement of experts from the industry. This programme is part of the curriculum for undergraduate degree programmes at all the universities [5]. Some of the programmes are compulsory for students to take. Table 1 show the summary of industrial programmes in KUKUM which compulsory for all students to undergo in prior of completing their study.

Table 1. Summary of industrial programme in KUKUM.

Year	First	Second	Third	Fourth
Programme	Industrial Exposure (IndEx)	Industrial Entrepreneurship (IndEnt)	Industrial Training (InTra)	Social Ethics & Career Fair
Duration	One week	3 days – one week	4 months – 6 months	Two days

2. Industrial Exposure

Industrial Exposure (IndEx) is compulsory for first year student to expose them with the industry. The students must undergo a structured programme including visit to the industrial shop floor, talks by members of the industry and technical forum. This will expose students to the real working environment in industry or business, beside providing them an opportunity to develop and build their self-confidence. Besides, practical interaction between this university and the industry can be reinforced to gain in-depth understanding on the deployment engineering disciplines in the industry. All students have to go through IndEx in order to qualify them to undergo InTra. The objectives of this programme include:

- To aware students with industrial working environment while studying in the related area of study.
- To provide motivating environment that will assist them to improve their academic record by exposing them to the daily rigors of competition in the job sector.
- To expose the students to real-life work culture.
- To develop the requisite interpersonal skills and knowledge that will prepare them for the job market.

The IndEx programme that has been conducted in this university previously can be summarized as in Table 2.

Table 2. IndEx programmes.

Date	No. of students	Industries
23-28 March 2003	108	Intel Technology, Solectron, Kulim Technology Park Corporation, Magna Instruments Sdn. Bhd. and Silterra Malaysia Sdn. Bhd.
15–17 March 2004	480	Cement Industries of Malaysia (CIMA), Agilent Technologies (Malaysia) Sdn. Bhd., Asian Composites Manufacturing Sdn Bhd, Solectron Technology Sdn Bhd, TQM Consultants Sdn Bhd, Pentamaster Technology (M) Sdn Bhd, Malaysia Smelting Corporation Berhad, Permintex Holdings Sdn Bhd, SR Technology Sdn Bhd and Global E-Technic Sdn Bhd.
30 March – 1 April 2005	540	Silterra Malaysia Sdn Bhd, Exsedia Sdn Bhd, Intel Technology Sdn Bhd, Flex-P Industries Sdn Bhd, Intel Products (M) Sdn Bhd, LD Technologies Sdn Bhd, Pentamaster Technology (M) Sdn Bhd, Kilang Gula Felda Perlis Sdn Bhd, SR Technology Sdn Bhd, Global E-Technic Sdn Bhd, Starton Industrial, Exzone Plastics, Manufacturers Sdn Bhd, Malaysia Smelting Corporation Berhad, PERNEC Advanced Networks Sdn Bhd, Industrial Quality Management Sdn Bhd, AIC Semiconductor Sdn Bhd and Advance Material Center SIRIM Berhad

3. Industrial Entrepreneurship

Industrial Entrepreneurship (IndEnt) is a brief programme that expose second year students with entrepreneurship skills. The activities comprise of talk, dialog and demonstration. This activities are organized with

collaborate from industrial sectors, R&D firm, professional bodies and public sectors. This programme also involved the expert and successful entrepreneurs from various field. The objectives of this programme include:

- To expose students in term of development their skills as entrepreneur in industrial technology and engineering.
- To open the student mind by developing the requisite interpersonal skills and knowledge to involve in entrepreneurship.
- To produce educated, skill and competence engineers to demanding needs of the manpower requirement in the industry.
- To expose students in engineering entrepreneur aspect.

There are some programmes has been done in this university recently as shown as in Table 3.

Table 3. IndEnt programme.

BIL.	TOPIC	SPEAKER	DATE
IndEnt Bil 01/2004	Preparations for becoming a Technopeneur in the era of globalization.	En Mohd Manan Mohd Razali Pengarah, Aliya Technologies Sdn Bhd	3 January 2004
IndEnt Bil 02/2004	Excite the Entrepreneur	En Kevin Poh Wee Leng Technopreneurs Association of Malaysia (TEAM)	14 February 2004
IndEnt Bil 03/2004	Usahawan Teknologi: Persiapan Mentor & Kemahiran	En Mohd Takiuddin Bin Shuaib Pengarah Urusan, Mixed Action Sdn Bhd	25 September 2004

4. Industrial Training

Industrial Training (InTra) program is a program that is much similar to conventional industrial training in renowned universities. In KUKUM, every student has to undergo compulsory practical work in term of industrial training prior to the completion of their studies. The students must attend work in the industry for a minimum of 4 months (16 weeks) during the second semester in their third year of study. The duration of the industrial training is about 16 weeks (4 months) minimum. In some cases, this period of time is extended up to 6 months maximum. InTra also is one of the requirements from “Board of Engineers Malaysia” for the degree program. The objectives of the InTra are:

- To expose the students to engineering practice and professional work style
- To introduce students the relationship between theory and real application
- To expose students to the actual working environment
- To expose students to potential employers
- To enable students build and improve creativity, and also to provide a channel for sharing or exchange of ideas between the students and other staff.

The InTra was coordinated by the CIC with representatives from all schools involved in administering the programme. CIC produce all the procedures from the application until the end of the training. The procedures comprise of the placement procedure, the confirmation placement procedure and assessment procedure. In administering the InTra, students are assigned to companies that match their field of studies. After the students have received confirmation on the placement, their respective school will approve the suitability based on the companies’ record or by checking with the officials of the companies. Otherwise, the school has the right to reject the companies if they do not match with the students’ courses. Therefore, the students must reapply for other companies.

While on training, students are required to fill up their log book, prepare reports, and deliver presentation. This is the requirements for passing the InTra. Students have two supervisors, one in KUKUM and the other in industry. Lecturers supervising the students on InTra normally visit the students at less one time during the training period. The visit usually takes place within 2 months of the training or half of their training period. Marks are given based on evaluation from the company and university as shown in Fig 1. In return, they are awarded 6 credits and grades for this training. Matured students who already possess years of industrial experience can be exempted from going to the industry for training. Instead, they stay in campus to perform small projects under the supervision of lecturers [1]. As with those who go out to the industry, log books, reports, and presentations are also expected of these students.

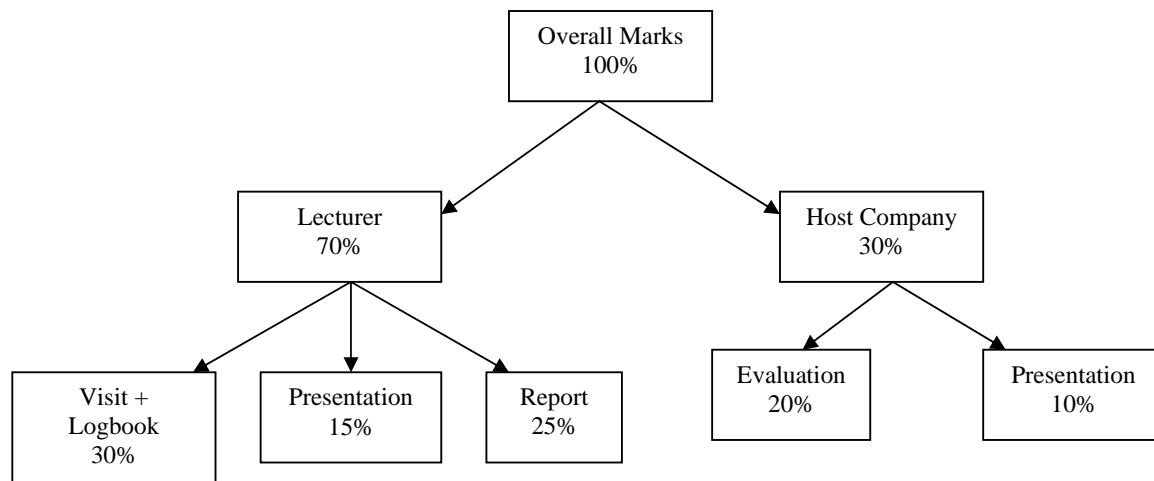


Fig 1. Intra marks assessment.

5. Social Ethics & Career Fair

Social ethics programme is a programme to give the guide lines, advices and some tips to the students in prior of attending the interview and furthermore in regards to problems that they have to face later in their careers especially in the communication skills. This program is compulsory for final year students. This program has three section talks which is involved three speakers from various organizations as shown as in Table 4. While, career fair give an opportunity for the industries to join an exhibition and also they can open a shot interview for final year students. The students also have a chance to discuss with the industrial representative about the current career opportunities, industry trends, job vacancy, new employee application procedure, and others. The objectives of this programme include:

- To expose the students guide lines for attending an interview
- To expose the students about the social ethics
- To expose the students about the experience of interview
- To help students choose their right career
- To give an opportunity to student to communicate with the industries' representative

Table 4. Social Ethics and Career Fair.

Title	Speaker	Organization
First Slot: Interview Ethic	En. Ahmad Fuad Mohd. Amin	Free Scale Semiconductor (M) Sdn. Bhd., PJ
Second Slot: Social Ethic-Government Perspective	Tn. Haji Azhar Omar	INTAN, Kawasan Utara
Third Slot: Social Ethic-Engineering Industrial Perspective	Pn. Norita Wan Mat	Intel Techonolgy Sdn. Bhd., Penang

6. Conclusions

We have discussed about our collaboration between university and industry. We also discussed about the programmes that the students should follow in prior of completing their study. Having a good collaboration with industry, our badge of young engineers will hopefully be able to gain the experience and knowledge in prior of working in industry as an engineer. The proper planning and programmes give the advantages to the students to enable them to collect practical experiences in regards to problem that they have to face later in their job. The students are also can practice and apply their knowledge and skills during industrial training. This will expose students directly to the real working environment in industry.

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